3.2.2(e)(iv). Appropriate performance evaluations of the model have shown that the model is not biased towards underestimates;

- Although no assessment of bias has been conducted for the OLM model, based on the "Sensitivity Analysis of PVMRM and OLM in AERMOD" report, OLM was estimated to provide similar or more conservative estimates of concentration than PVMRM and therefore would also be judged to be unbiased toward underestimation.

3.2.2(e)(v). A protocol on methods and procedures to be followed has been established;

- The methods and procedures for conducting an assessment for determining compliance with the 1-hr federal NAAQS was established in the modeling protocol titled " *Rosemont Copper Company AERMOD Modeling Protocol to Asses Ambient Air Quality Impacts* " submitted to ADEQ on December 2, 2011.

EPAs guidance "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 01, 2011" recommends use of an in-stack NO_2/NO_x ratio of 0.5, but allows different ratios to be used provided that available data justifies use. Lower NO_2/NO_x ratios for boilers, blasting and compression ignition internal combustion engines have been recommended by regulatory agencies including the Texas Commission on Environmental Quality (TCEQ) and the San Joaquin Valley Air Pollution Control District (SJVAPCD). The value of 0.1 was the default value in the addendum to the AERMOD user guide "Addendum: User's Guide for the AMS/EPA Regulatory Model AERMOD, EPA-454/B-03-001, September 2004". Because the overwhelming majority of NO_x emissions are from mobile sources, an in-stack ratio of 0.05 was used for mobile sources as well as sources with internal combustion engines. To be conservative, blasting NO_x emissions were modeled at the default in-stack ratio value of 0.5 although there have been scientific studies which report lower values. For analysis of the available data and justification pertaining to the NO_2 to NO_x ratio of 0.05, see Appendix F.

The OLM method requires hourly background ozone values to calculate the conversion of NO_2 to NO_x. Hourly background ozone values from the Chiricahua National Monument IMPROVE site were used (see previous section for explanation). This data base is complete with only 4% missing data. The missing data was replaced based on the methodology suggested by ADEQ in its comments to the modeling protocol (See Appendix H). The OLMGROUP option was used which essentially models all the plumes as one combined plume.

5.2 Receptor Network

Following the ADEQ Guidance, the receptor grid (see Figure 5.1) consisting of the following was modeled:

- receptors spaced at 25 meters along the Process Area Boundary (PAB);
- receptors spaced at 100 meters from the PAB to 1 kilometer;
- receptors spaced at 500 meters from 1 kilometer to 5 kilometers;
- receptors spaced at 1000 meters from 5 kilometers to 10 kilometers.

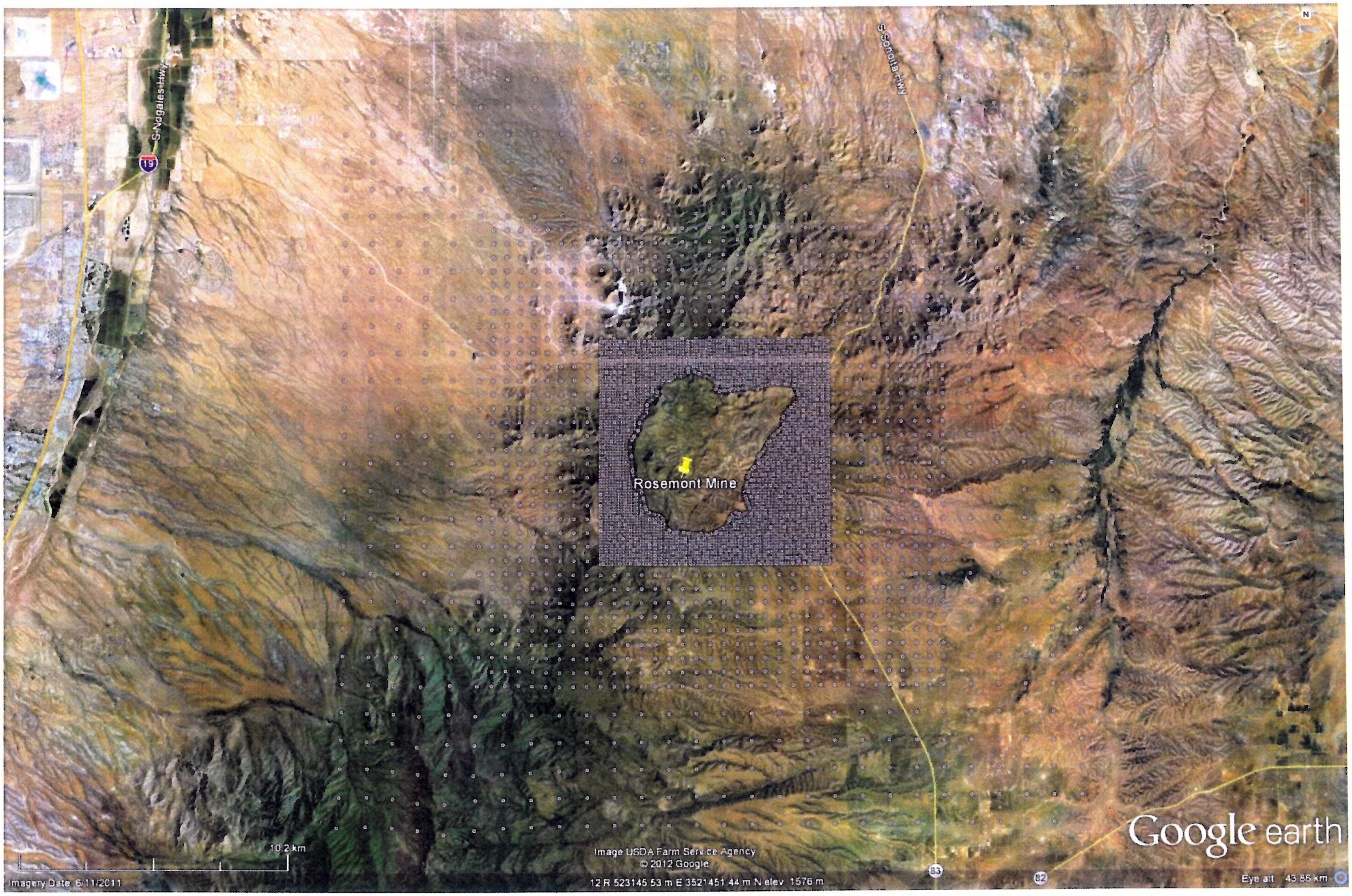

Figure 5.1 Receptor Grid Network used in the Rosemont Modeling Analysis

7. EVALUATION OF DISPERSION MODELING RESULTS

Evaluation of protection of the NAAQS was performed by comparing the maximum modeled impacts to the applicable standards. All the information necessary for this evaluation including: (a) background concentrations; (b) source location map; (c) complete list of source parameters; (d) complete modeling input and output files; and (e) graphic presentations of the modeling results for each pollutant, showing the magnitude and location of the maximum ambient impacts are presented in the sections below. The modeling results demonstrating the protection of the NAAQS at the Rosemont facility for Year 1 and Year 5 are summarized in Table 7.1 and Table 7.2. The receptor locations of each of the modeled maximum criteria pollutant concentrations are shown in Figures 7.1 and 7.2. The methodology used for evaluating protection of the NAAQS for each pollutant of interest is described below.

7.1 CO Evaluation

For the Year 1 modeling, the predicted highest 2nd high 1-hour and 8-hour CO concentrations were 1480.7 $\mu g/m^3$ and 696.7 $\mu g/m^3$, respectively. These predicted concentrations added to the 1-hour and 8-hour CO background concentrations of 582.0 $\mu g/m^3$ and 582.0 $\mu g/m^3$, yield maximum ambient concentrations of 2062.7 $\mu g/m^3$ and 1278.7 $\mu g/m^3$ respectively. Similarly, for the Year 5 modeling, the maximum 1-hour and 8-hour ambient concentrations were 1906.4 $\mu g/m^3$ and 1227.0 $\mu g/m^3$ respectively. The receptor locations at which these concentrations occurred are shown in Figure 7.1 and 7.2. These concentrations are less than the applicable 1-hour and 8-hour CO NAAQS of 40,000 $\mu g/m^3$ and 10,000 $\mu g/m^3$ respectively.

7.2 NO_2 Evaluation

Although emissions are estimated in terms of total NO_x, only NO_2 has a NAAQS. NO_x emissions from fuel combustion sources are primarily NO (nitrous oxide) which gradually converts to NO_2 over time. Comparison of the maximum predicted NO_x concentrations with the annual NAAQS for NO_2 thus represents a very conservative method of demonstrating protection of NAAQS. Modeling for the 1-hour NO_2 concentration was conducted using the in-stock NO_2/NO_x ratios as described in Section 5.1.

The highest predicted annual NO_2 concentration for the Year 1 modeling was 22.3 $\mu g/m^3$ whereas the 98th percentile 1-hour NO_2 concentration was 139.7 $\mu g/m^3$. The predicted highest annual concentration and 98th percentile 1-hour concentration added to the annual background concentration of 4.0 $\mu g/m^3$ and 1-hour background concentration of 24.5 $\mu g/m^3$ yields a maximum annual and 1-hour ambient concentration of 26.3 $\mu g/m^3$ and 164.2 $\mu g/m^3$ respectively. Similarly, the Year 5 modeling yields a maximum annual and 1-hour ambient concentration of 25.9 $\mu g/m^3$ and 156.9 $\mu g/m^3$ respectively. The receptor location at which these concentrations occurred are shown in Figures 7.1 and 7.2. These concentrations are less than the applicable annual and 1-hr NO_2 NAAQS of 100 $\mu g/m^3$ and 188.6 $\mu g/m^3$.

7.3 PM_{10} Evaluation

The predicted highest 4th high 24-hour PM_{10} concentration for the Year 1 and Year 5 modeling was 99.3 $\mu g/m^3$ and 99.2 $\mu g/m^3$ respectively. These predicted concentrations added to the 24-hour PM_{10}

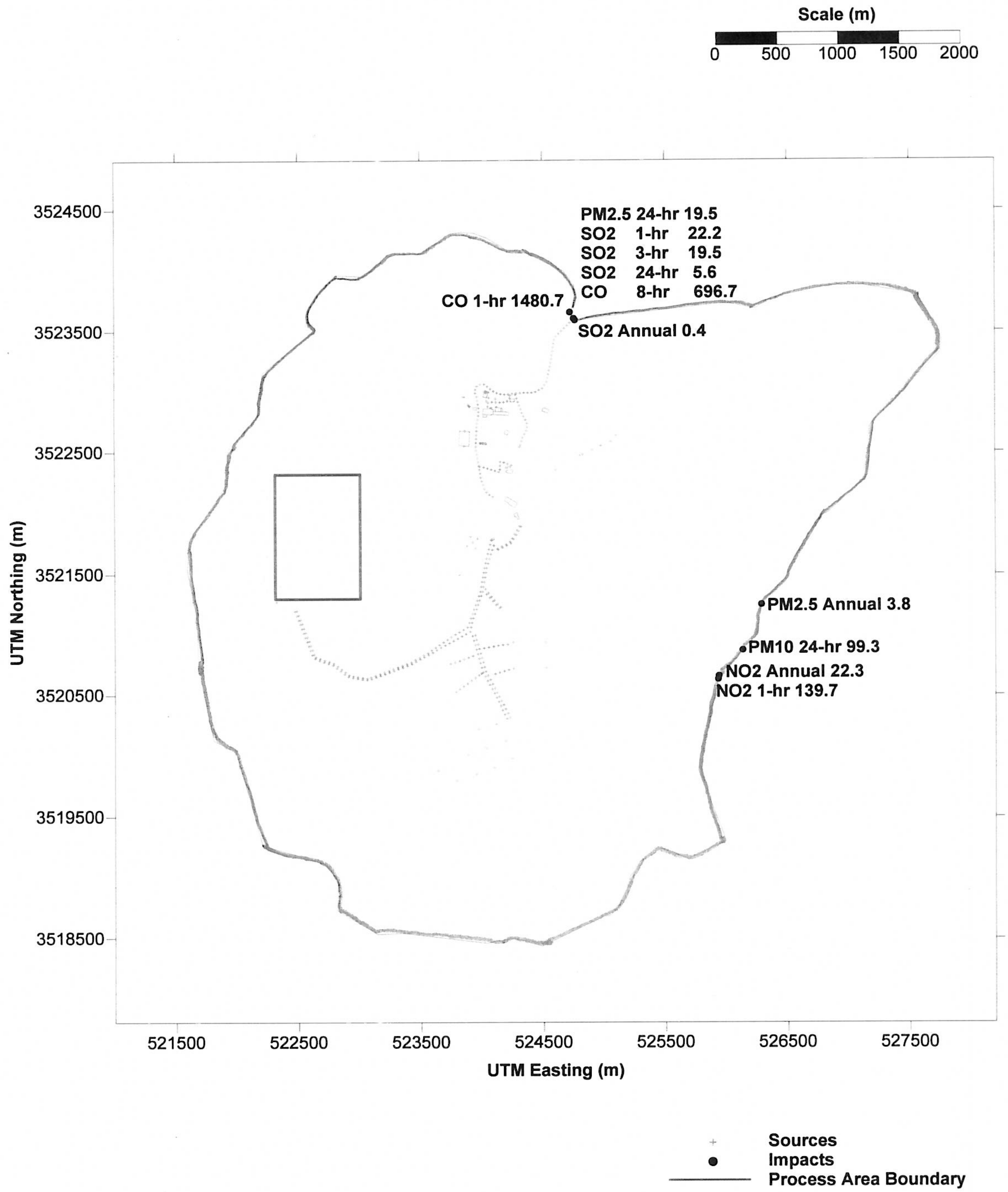

Figure 7.1 Receptor location of Modeled Impacts due to emissions for Year 1 (Concentrations are listed in units of $\mu g/m^3$)